

behavioural public economics

Behavioural public economics incorporates ideas from behavioural economics, psychology, and neuroscience in the analysis and design of public policies. This article provides an introduction to its methods and discusses its application to savings and addiction policy.

Interest in the field of psychology and economics has grown in recent years, stimulated largely by accumulating evidence that the neoclassical model of consumer decision-making provides an inadequate description of human behaviour in many economic situations. Scholars have begun to propose alternative models that incorporate insights from psychology and neuroscience. Some of the pertinent literature focuses on behaviours commonly considered 'dysfunctional', such as addiction, obesity, risky sexual behaviour, and crime. However, there is also considerable interest in alternative approaches to more standard economic problems such as saving, investing, labour supply, risk-taking, and charitable contributions.

Behavioural public economics (BPE) is the label used to describe a rapidly growing literature that uses this new class of models to study the impact of public policies on behaviour and well-being (see Bernheim and Rangel, 2006a, for a more comprehensive review).

Background: the neoclassical approach to public economics

Public economic analysis requires us to formulate models of human decision-making with two components – one describing choices, and the other describing well-being. Using the first component, we can forecast the effects of policy reforms on individuals' actions, as well as on prices and allocations. Using the second component, we can determine whether these changes benefit consumers or harm them.

The neoclassical approach assumes that individuals' choices can be described *as if* generated by the maximization of a well-defined and stable utility function subject to feasibility and informational constraints. Neoclassical welfare analysis proceeds from the premise that, when evaluating policies, the government should act as each individual's proxy, extrapolating his preferred choices from observed decisions in related situations. This premise justifies the use of the *as-if* utility function as a gauge of well-being. In effect, this approach uses the same model for positive and normative analysis.

Within the neoclassical paradigm, government policy can affect behaviour and welfare only if it changes the decision maker's information or budget constraint. For example, vaccination campaigns may influence behaviour by providing information concerning the risks of a disease and the advantages of taking preventive action, while cigarette taxes may alter choices by raising the cost of smoking.

From the neoclassical perspective, government intervention in private markets is justified to enforce property rights, correct market failures, and address inequity by redistributing resources. Standard examples of interventions motivated by market failures include the use of taxes and subsidies to correct externalities, the provision of public goods, and the introduction of social insurance when private risk sharing is inefficient.

The accomplishments of neoclassical public economics, such as the theories of optimal income taxation and corrective environmental policy, are considerable. However, there is growing concern that this paradigm does not

adequately address a number of important public policy challenges – for example, what to do about ‘self-destructive’ behaviours such as substance abuse, or about the apparently myopic choices of those who save ‘too little’ for retirement. Since the neoclassical welfare criterion respects all voluntary consumer choices (conditional on the information in the consumer’s possession), it rules out the possibility of enhancing well-being by correcting ‘poor’ choices (except through the provision on information).

The behavioural approach to public economics

A key feature of BPE is the potential divergence of positive and normative models. Even when it is assumed that individuals are endowed with well-behaved lifetime preferences, decision processes may translate these preferences to choices imperfectly. To conduct positive analysis, one employs a model of the potentially imperfect decision process. To conduct normative analysis, one uses a well-defined welfare relation. In stark contrast to the neoclassical approach, the welfare relation may prescribe an alternative other than the one that the individual would choose for himself, at least under some conditions.

The analysis of addiction presented in Bernheim and Rangel (2004) illustrates this approach. Our model assumes that people attempt to optimize given their preferences, but randomly encounter conditions that trigger systematic mistakes, the likelihood of which evolves with previous substance use. The model is based on the following three premises. First, use among addicts is sometimes a mistake and sometimes rational. Second, experience with an addictive substance sensitizes an individual to environmental cues that trigger mistaken usage. Third, addicts understand their susceptibility to cue-triggered mistakes and attempt to manage the process with some degree of sophistication. The first two premises are justified by a body of research in psychology and neuroscience, which shows that, after repeated exposure to an addictive substance, the brain tends to overestimate the hedonic consequences of drug consumption upon encountering environmental cues that are associated with past use. The third premise is justified by behavioural evidence indicating that users are often surprisingly sophisticated and forward looking.

The (β, δ) -model of intertemporal choice (Strotz, 1956; Phelps and Pollack, 1968; Laibson, 1997; O’Donoghue and Rabin, 1999; 2001) also illustrates the BPE approach. Psychologists have found that people often act as if they attach disproportionate importance to immediate rewards relative to future rewards, especially in situations where cognitive systems are overloaded. (For a recent review of this literature, see Frederick, Loewenstein and O’Donoghue, 2002; Loewenstein, Read and Baumister, 2003.) To capture this tendency, the (β, δ) -model assumes that, in each period t , individuals behave as if they maximize a utility function of the form

$$u(c_t) + \beta \left[\sum_{k=t+1}^T \delta^{k-t} u(c_k) \right],$$

where $0 < \beta < 1$. In this framework, the parameter β represents the degree of *present bias* or *myopia*. The neoclassical model corresponds to the special case where $\beta = 1$. With $\beta < 1$, behaviour is dynamically inconsistent. This complicates positive analysis, since behaviour no longer corresponds to the solution of single utility maximization problem.

Many analysts interpret present bias as a mistake. They argue that the individual's underlying well-being actually corresponds to the preferences revealed through choices that do not involve immediate rewards:

$$U(c_1, \dots, c_T) = \sum_{t=0}^T \delta^t u(c_t).$$

Under this interpretation, $\beta < 1$ creates a tendency to consume excessively in the present.

These examples illustrate some important conceptual and methodological aspects of BPE. First, with behaviour and welfare modelled separately, BPE allows for the possibility of mistakes. In contrast to a neoclassical analyst, a BPE analyst can pose questions that presuppose possible divergences between behaviour and preferences, such as whether Americans save too little for retirement, or whether addicts engage in self-destructive behaviour. Within the BPE framework, one can test the hypothesis that individuals maximize their well-being, and measure the magnitude of their errors. Second, to justify either a positive representation of choice or a particular welfare criterion, a BPE analyst relies on evidence from psychology and neuroscience. This evidence can help economists pin down underlying preferences by identifying the mechanisms responsible for the decision-making errors. Good structural models of decision-making processes may also improve the quality of out-of-sample behavioural predictions, which are often required for policy evaluation.

Behavioural policy analysis

BPE models are extensions of neoclassical models. Thus, they imply that public policy can modify behaviour by changing budget constraints and/or information. For example, cigarette prices affect cigarette consumption in the Bernheim–Rangel addiction model, and savings are responsive to interest rates in most specifications of the (β, δ) -model.

In addition, the BPE framework introduces new channels through which public policy can affect behaviour and welfare. In particular, it allows for the possibility that some public policies can influence behaviour *directly* by activating particular cognitive processes, even when they leave budget constraints and information unchanged.

For example, Brazil and Canada require every pack of cigarettes to display a prominent, viscerally charged image depicting some deleterious consequences of smoking, such as lung disease and neonatal morbidity. Since the consequences of smoking are well known, this policy has no effect in information or budget constraints. And yet the Bernheim–Rangel theory of addiction allows for the possibility that a sufficiently strong counter-cue could reduce the probability of a mistake by triggering thought processes that induce users to resist cravings. When successful, this policy affects behaviour by activating particular cognitive processes.

Another striking example involves the effects of default options in employee-directed pension plans. A ‘default option’ is the outcome resulting from inaction. For a neoclassical consumer, choices depend only on preferences, information, and constraints. Consequently, in the absence of significant transaction costs, default options should be inconsequential. However, in the context of decisions concerning saving and investment, defaults seem to matter a great deal. For example, with respect to 401(k) plans (employer-sponsored retirement savings accounts in the United States that

receive preferential tax treatment), there is considerable evidence that default options affect participation rates, contribution rates, and portfolios (Madrian and Shea, 2001; Choi, Laibson and Madrian, 2004). Yet, arguably, a default neither affects opportunities (since transaction costs are low) nor provides new information.

While BPE models admit traditional justifications for government intervention in private markets (the enforcement of property rights, the correction market failures, and the redistribution of resources), they also introduce novel justifications. For example, public policy may improve welfare by reducing the size, likelihood, or consequences of mistakes. As shown in the next two sections, this can lead to conclusions that are strikingly at odds with those generated by the neoclassical model.

Example: addiction policy

In the neoclassical theory of rational addiction (Becker and Murphy, 1988), government intervention may be justified *only* when it corrects market failures involving addictive substances, such as second-hand smoking, or when it combats ignorance or misinformation. In contrast, in our model of addiction (Bernheim and Rangel, 2004), government intervention may also be justified when it reduces the frequency, magnitude, and consequences of mistakes. These considerations give rise to a number of non-standard policy implications.

Limitations of informational policy. In practice, public education campaigns (such as anti-smoking and anti-drug initiatives) have achieved mixed results. Our view of addiction highlights a fundamental limitation of informational policy: contrary to standard theory, one cannot assume that even a highly knowledgeable addict always makes informed choices. Information about the consequences of substance abuse may affect initial experimentation with drugs, but cannot alter the neurological mechanisms through which addictive substances subvert deliberative decision-making.

Beneficial harm reduction. If addiction results from randomly occurring mistakes, various interventions can serve social insurance objectives by ameliorating some of its worst consequences. For instance, subsidization of rehabilitation centres and treatment programmes (particularly for the indigent) can moderate the financial impact of addiction and promote recovery. Likewise, the free distribution of clean needles can moderate the incidence of diseases among heroin addicts. In some cases, it may even be beneficial to make substances available to severe addicts at low cost, a policy used in some European countries.

Counterproductive disincentives. Policies such as ‘sin taxes’ strive to discourage use by making substances costly. This is potentially justifiable on the grounds that use generates negative externalities. Even higher taxes (whether implicit or explicit) might be justified if they also reduce ‘unwanted’ use. Unfortunately, the compulsive use of addictive substances is probably much less sensitive to costs and consequences than is deliberative use. Consequently, imposing costs on users in excess of the standard Pigouvian levy will likely distort deliberate choices detrimentally, without significantly reducing problematic compulsive usage. In addition, policies that impose high costs on use may thwart social insurance objectives by exacerbating the consequences of uninsurable risks associated with the use of addictive substances, such as poverty and prostitution. Accordingly, for some substances the optimal rate of taxation for addictive substances may be significant *lower* than that the

standard Pigouvian levy (see Bernheim and Rangel, 2005, for simulation results).

Policies affecting cues. Since environmental cues appear to trigger addictive behaviours, public policy can also influence use by changing the cues that people normally encounter. One approach involves the elimination of problematic cues. For example, advertising and marketing restrictions of the type imposed on sellers of tobacco and alcohol suppress one possible artificial trigger for compulsive use. Since one person's decision to smoke may trigger another, confining use to designated areas may reduce unintended use. Another approach involves the creation of counter-cues, which we discussed above. Policies that eliminate problematic cues or promote counter-cues are potentially beneficial because they combat compulsive use while imposing minimal inconvenience and restrictions on rational users.

Facilitation of self-control. Most behavioural theories of addiction potentially justify policies that provide better opportunities for self-regulation without making particular choices compulsory. In principle, this helps those who are vulnerable to compulsive use without encroaching on the freedoms of those who would deliberately choose to use. Laws that limit the sale of a substance to particular times, places, and circumstances may facilitate self-regulation. Well-designed policies could in principle accomplish this objective more effectively. For example, a number of states have enacted laws allowing problem gamblers to voluntarily ban themselves from casinos. Alternatively, if a substance is available only by prescription, and if prescription orders are filled on a 'next day' basis, then deliberate forward-looking planning becomes a prerequisite for availability. In the absence of a pervasive black market, recovering heroin addicts could self-regulate problematic compulsive use by carefully choosing when, and when not, to file requests for refills.

Example: savings policy

The (β, δ) -model of savings also exemplifies the novel policy insights generated by the BPE approach. For example, this model implies that many individuals will save too little for retirement, and that there may be Pareto improving policy interventions even in the absence of capital market distortions – a conclusion that is at odds with the neoclassical framework. Other notable implications include the following:

Mandatory savings policies. Within the (β, δ) framework, compulsory saving may be welfare-enhancing if it fully crowds out private saving (in the form of liquid assets) at some point during the life cycle (Imrohoroglu, Imrohoroglu and Joines, 2003; Diamond and Koszegi, 2003). This provides a rationale for mandatory savings programmes, which are pervasive across the world, and which are more difficult to justify within the neoclassical framework.

Saving subsidies. On the assumption that (a) the population includes some individuals with self-control problems and (b) the social welfare function is continuous and concave, a small subsidy for saving financed with lump-sum taxes is welfare improving (O'Donoghue and Rabin, 2006; Krusell, Kuruscu and Smith, 2000; 2002). Intuitively, the subsidy produces a first-order improvement in the well-being of individuals with self-control problems (since they save too little), and only a second-order reduction in the well-being of those without self-control problems. This provides a possible rationale for tax-favoured savings programmes, such as, in the United States, 401(k) plans and Individual Retirement Accounts (IRAs).

Credit restrictions. Introducing restrictions on the availability of credit, for example, by regulating the distribution of revolving credit lines and mandating credit ceilings, can potentially enhance the well-being of those with self-control problems. For example, Laibson, Repetto and Tobacman (2004) estimate that the representative (β, δ) consumer would be willing to pay \$2000 at the age of 20 to exclude himself from the credit card market.

Behavioural public economics circa 2006

As of 2006, the rapidly growing field of BPE has demonstrated its value by enhancing our understanding of public policy in several areas, including savings and addiction. Nevertheless, the literature is still in its infancy. As time passes, we anticipate that the methods and tools of BPE will contribute new insights in these areas, as well as to other difficult public policy issues involving poverty, crime, corruption, violence, obesity, and charitable giving, among others.

In addition to providing new insights concerning the effects of familiar policies, research in BPE can also guide the design of new policies. One obvious goal is to reduce the frequency of mistakes among those who behave suboptimally without interfering with the choices of those who behave optimally. Some recent fieldwork by Thaler and Bernartzi (2004), who advocate a savings programme called Save More Tomorrow, illustrates the potential value of this approach. In this programme, a worker can allocate a portion of her future salary increases towards retirement savings. Subsequently, she is allowed to change this allocation at a negligible transaction cost. In practice, 78 per cent of those who were eligible for the plan chose to participate, 80 per cent of participants remained in the plan through the fourth pay raise, and the average contribution rate for programme participants increased from 3.5 per cent to 13.6 per cent over the course of 40 months.

To date, progress in BPE has been somewhat hampered by the absence of a general framework for behavioural welfare analysis. Analysts tend to devise and justify welfare criteria on a case-by-case basis, rather than through the application of general principles. Ongoing research aims to fill this gap (see Bernheim and Rangel, 2006b).

B. Douglas Bernheim and Antonio Rangel

See also

< xref = xyyyyyy > addiction;
 < xref = xyyyyyy > behavioural game theory;
 < xref = xyyyyyy > charitable giving;
 < xref = N000157 > neuroeconomics;
 < xref = P000350 > public good experiments.

Bibliography

Becker, G. and Murphy, K. 1988. A theory of rational addiction. *Journal of Political Economy* 96, 675–700.

- Bernheim, B.D. and Rangel, A. 2004. Addiction and cue-triggered decision processes. *American Economic Review* 94, 1558–90.
- Bernheim, B.D. and Rangel, A. 2005. From neuroscience to public policy: a new economic view of addiction. *Swedish Economic Policy Review* 12, 11–46.
- Bernheim, B.D. and Rangel, A. 2006a. Behavioral public economics: welfare and policy analysis with fallible decision-makers. In *Economic Institutions and Behavioral Economics*, eds. P. Diamond and H. Vartiainen. Princeton: Princeton University Press, (forthcoming).
- Bernheim, B.D. and Rangel, A. 2006b. Toward choice-theoretic foundations for behavioral welfare economics. *American Economic Review Papers and Proceedings*, (forthcoming).
- Choi, J., Laibson, D. and Madrian, B. 2004. Plan design and 401(k) savings outcomes. *National Tax Journal* 57, 275–98.
- Diamond, P. and Koszegi, B. 2003. Quasi-hyperbolic discounting and retirement. *Journal of Public Economics* 87, 1839–72.
- Frederick, S., Loewenstein, G. and O'Donoghue, T. 2002. Time discounting and time preference: a critical review. *Journal of Economic Literature* 40, 351–401.
- Imrohoroglu, S., Imrohoroglu, A. and Joines, D. 2003. Time inconsistent preferences and social security. *Quarterly Journal of Economics* 118, 745–84.
- Krusell, P., Kuruscu, B. and Smith, A. 2000. Tax policy with quasi-geometric discounting. *International Economic Journal* 14(3), 1–40.
- Krusell, P., Kuruscu, B. and Smith, A. 2002. Equilibrium welfare and government policy with quasi-geometric discounting. *Journal of Economic Theory* 105, 42–72.
- Laibson, D. 1997. Golden eggs and hyperbolic discounting. *Quarterly Journal of Economics* 112, 443–77.
- Laibson, D., Repetto, A. and Tobacman, J. 2004. Estimating discount functions from lifecycle consumption choices. Working paper, Harvard University.
- Loewenstein, G., Read, D. and Baumister, R. (eds.) 2003. *Time and Decision: Economic and Psychological Perspectives on Intertemporal Choice*. New York: Russell Sage Foundation.
- Madrian, B. and Shea, D. 2001. The power of suggestion: inertia in 401(k) participation and savings behavior. *Quarterly Journal of Economics* 116, 1149–87.
- O'Donoghue, T. and Rabin, M. 1999b. Doing it now or later. *American Economic Review* 89, 103–24.
- O'Donoghue, T. and Rabin, M. 2001. Choice and procrastination. *Quarterly Journal of Economics* 121–60.
- O'Donoghue, T. and Rabin, M. 2006. Optimal sin taxes. *Journal of Public Economics* 90, 1825–49.
- Phelps, E. and Pollack, R. 1968. On second-best national savings and game equilibrium growth. *Review of Economic Studies* 35, 185–99.
- Strotz, R.H. 1956. Myopia and inconsistency in dynamic utility maximization. *Review of Economic Studies* 23, 165–80.
- Thaler, R.H. and Bernartzi, S. 2004. Save more for tomorrow: using behavioral economics to increase employee savings. *Journal of Political Economy* 112, S164–S187.

Index terms

addiction
 behavioural public economics
 budget constraints
 compulsory saving
 default options
 imperfect decision processes
 intertemporal choice
 lump-sum taxes
 myopia
 neoclassical public economics
 neuroscience
 Pigouvian taxes
 psychology and economics

tax incentives for saving
well-being

Index terms not found:

Pigouvian taxes
tax incentives for saving